

21302



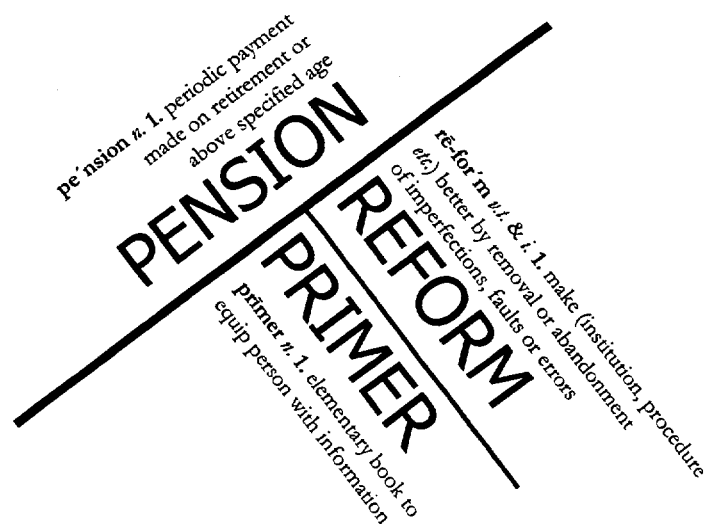
Notional Accounts as a Pension Reform Strategy: An Evaluation

Richard Disney

December 1999

Notional accounts as a pension reform strategy: An evaluation

Richard Disney



Notional accounts as a pension reform strategy: An evaluation

Richard Disney^{*}

^{*} Professor of Economics, University of Nottingham; Research Fellow, Institute for Fiscal Studies and Director, Axia Economics. Contact: Axia Economics, 38 Concanon Road, London SW2 5TA; e-mail richard.disney@axiaecon.com; web: www.axiaecon.com.

My thanks to participants at a seminar on the Swedish pension reform at the World Bank in May 1998. I have also benefited from discussions with, and reading the work of Axel Börsch Supan, Elsa Fornero, Louise Fox, Edward Palmer, Salvador Valdés-Prieto, Michal Rutkowski, Annika Sundén, Anita Schwarz and Patrick Wiese on this topic. Robert Palacios and Edward Whitehouse edited the paper.

This study is part of the World Bank's Pension Reform Primer: a comprehensive, up-to-date resource for people designing and implementing pension reforms around the world. Details are available from www.worldbank.org/pensions.

Foreword

This is the first of what may be several papers in the Pension Primer series on the subject of notional accounts. It takes a specific view on this approach to reform unfunded systems, and the assessment may not be universal. The same is likely to apply to the subsequent Primer paper on Notional Accounts by Edward Palmer. While Notional Accounts reforms have already been implemented in various countries, including Sweden, Latvia, Italy and Poland, the experience is very recent and hence the jury is still out as to whether this constitutes a useful alternative to parametric reforms of unfunded schemes, a useful transition to partial funding, or even a useful alternative to the prefunding of pension commitments. Thus, the reader is encouraged to read through the primer papers on this topic as they become available, and to form his own opinion – as he or she always should.

Robert Holzmann
Director, Social Protection
Head of Task Force – Pension Primer

Table of contents

1. Introduction	5
2. Notional accounts: evolution and implementation	9
Background: Buchanan's proposal and 'point' systems	9
Italy	11
Latvia	12
Sweden	14
Poland	16
Notional accounts schemes in theory and practice	18
3. 'Actuarial fairness' and insurance features of the new scheme	18
Fairness in pension programmes: intragenerational outcomes	18
Fairness in pension programmes: intergenerational outcomes	21
Is there an insurance argument for unfunded individual accounts?	24
4. Macroeconomic aspects of notional accounts	25
Fiscal sustainability	25
Credibility in notional account pension schemes	30
5. Microeconomic aspects of notional accounts	32
The retirement decision	34
6. Conclusion	37
References	40

Notional accounts as a pension reform strategy: An evaluation

Richard Disney

1. Introduction

Faced with the fiscal unsustainability of many unfunded (pay-as-you-go) public pension programmes around the world — a problem that has been highlighted and exacerbated by demographic ageing in several countries — governments have been searching for effective and feasible pension reform strategies.¹ The traditional approach to pension reform, recently restated by Chand and Jaeger (1996), is to ‘fix up’ the existing unfunded pension programme by ‘parametric’ reforms. Such reforms include raising the age at which an individual first becomes eligible for the pension, cutting benefit accrual rates, decoupling pension increments from the growth of real earnings, and so on.²

Although any pension reform must almost certainly embody some elements of this strategy, the argument against wholesale reliance on an incremental process of this type is that it does not challenge the unfunded nature of existing pension programmes. As is well known, so long as dynamic efficiency holds (on which see, for example, Abel *et al.*, 1989, and Feldstein, 1996), it is efficient to fund pension programmes rather than to finance on a pay-as-you-go (unfunded) basis. Moreover, by funding, a stock of assets is accumulated to match the prospective liabilities of the scheme. This should in principle ameliorate the problem of fiscal sustainability in the face of long-run trends such as demographic ageing. The difficulty of course with this strategy for a country with an existing pay-as-you-go

¹ Throughout this paper I use the terminology ‘pensions’ and ‘public pensions’ in the European sense, as opposed to the US terminology of ‘social security’ and (private) ‘pensions’.

² Schwarz and Demirgüç-Kunt (1999) survey recent pension reforms around the world. Disney (1999) focuses on OECD countries, evaluating different reform strategies.

scheme is the transition cost for generations that also have to finance existing, unfunded, liabilities. However it should be borne in mind that *any* reform process designed to restore fiscal sustainability will reduce average pension benefits for some generations. Moreover, there is also a policy credibility question arising from incremental parametric reforms because time horizons of governments are short and policy can be reversed, as illustrated by recent experience in countries such as Germany and Japan.³

This difficulty of making reforms of pay-as-you-go pension schemes 'stick' has led to discussion of whether constitutional 'rules' could be introduced governing pension programmes (analogous to the establishment of an independent central bank to make monetary policy decisions): see Diamond (1997). Such rules could, for example, tie benefit generosity or retirement age explicitly to demographic parameters such as expected longevity or the projected trajectory of fertility. Again, however, the empirical evidence suggests that much of the problem in reforming pensions lies in changing *existing* constitutional public pension 'rules' (for example that benefits must fully replace earnings) and that constitutionality *per se* is not the solution. Instead, incorporating demographic predictions into the pension calculation directly might be a better response. This is, of course, exactly what a private annuity market should do.

An influential strategy of pension reform, championed by the World Bank (1994),⁴ decouples the 'redistributive' component of pensions from the 'insurance' component. In this framework, a 'multipillar' pension programme is envisaged. This would consist, in equilibrium, of: a first pillar of public, unfunded, benefits simply for income maintenance (redistributive) purposes; a mandatory second pillar, preferably funded and privately managed, providing pension benefits related to contributions by individuals or their employers; and, perhaps, a third pillar of voluntary, private, provision. This is the model exemplified by Anglo-Saxon countries such as Australia and the United Kingdom, as well as the Netherlands.⁵ In its more radical form, it also underpins the Latin American reforms, especially that of Chile. It contrasts with the traditional 'Bismarckian' scheme in which the

³ For a survey and development of a public choice framework for analysing unfunded public pension programmes, see Disney, Chapter 9. McHale (1999) shows the large effects recent reforms in six major OECD countries have had on the value of pension benefits.

⁴ Holzmann (2000) restates the case using more recent data.

⁵ See Flanagan (1999) for a description of the system in Australia and Whitehouse (1998) on the United Kingdom.

first two pillars are combined in an unfunded public programme that has the primary purpose of earnings replacement at retirement.

The attractions of a reform that separates the redistribution and insurance features are straightforward, as are its drawbacks. By switching to a substantial funded component to pension provision, the economy takes advantage of dynamic efficiency. By focussing on redistribution in the first pillar, the government still has scope for 'political' decisions, for example concerning generosity to the poorest. Moreover, separating out and perhaps 'privatising' the 'insurance' aspect of pensions allows the more general task of income replacement in old age to be taken out of the hands of the political process since governments rarely expropriate private property rights.⁶ Of course, the drawback is again the cost of the transition: some generations will have to provide both for their own retirement and for existing unfunded liabilities. Many living generations may be slightly worse off in such a reform strategy: it all depends on the extent to which dynamic efficiency holds.⁷ For this reason, many OECD governments in particular have been reluctant to follow the lead of countries such as Chile and the United Kingdom in shifting to a pension system dominated by funded, largely private, provision. Instead, private funded components are still regarded as a 'top up' to existing unfunded arrangements (perhaps 'parametrically' reformed) rather than the centrepiece of a new pension strategy.

In recent years, a third pension reform strategy has emerged. It is exemplified by the pension reforms in Latvia, Poland and Sweden and, implicitly, in the 'Dini reform' in Italy.⁸ It is actively under discussion in other countries. In this strategy, the bulk of the public unfunded system is reconstituted into a scheme of individual retirement accounts. These are known as 'notional accounts' because they are not funded *per se* but nevertheless represent individualised claims on future public resources. The idea is that these notional accounts

⁶ Of course, governments may affect the value of these rights by, for example, changing the tax treatment of private pensions, as has recently been done in the United Kingdom: see Whitehouse (1998, 1999a). Social assistance programmes can also affect the return to private pension savings of low-income workers by reducing benefits as pension income increases. So changes to these means tests can also affect the value of private pension rights indirectly.

⁷ For somewhat different views of this generational incidence based on simulations, see for example, Feldstein and Samwick (1998), Kotlikoff (1998), Kotlikoff, Smetters and Walliser (1998), Holzmann (1998) and Miles and Iben (1999). Of course, given dynamic efficiency, it is misleading to talk of this cost as a 'double burden', despite the frequent use of this term in commentaries on pension reform.

⁸ Named after the Prime Minister involved in introducing the reform. In contrast, to the 'Dini' reform, the 'Amato' reform in 1992 was a conventional, albeit radical, 'parametric' reform. 'Implicitly' is used because individualisation of pension accounts was not so central to the Italian reform strategy.

mimic a private defined contribution system of individualised accounts, with the 'return' on such accounts explicitly linked by law to a formula which takes account of current and prospective demographic and productivity change. This reform appears to eliminate the unsustainability of existing unfunded defined benefit plans by legally enforcing a variant of the Aaron-Samuelson condition that links the feasible return to an unfunded pension programme to real wage bill growth (for more discussion of this condition, see below).

Advocates of this third approach, such as Palmer (1999), point to the following attractions of the strategy:

- It overcomes issues of political feasibility and policy inconsistency arising from 'parametric reforms' and introduces a constitutional or legal link to sustainability through the pension calculation rather than through some overall non-governmental constitutional body.
- It returns an 'insurance' component to the public pension programme by linking benefits to contributions. This rules out perverse redistributive features in the scheme and (it is argued) gives individuals a greater incentive to work or continue to work since economic activity increases pension rights in a transparent manner. As a consequence, the gains of a parametric reform (such as deferring retirement age) may be achieved through incentives rather than by politically contentious legislation.
- Linking accruals and pension calculations to objective signals of macroeconomic sustainability, such as the growth of the wage bill and improvements in longevity, enhances the credibility of the fiscal system.
- Leaving aside the problem of the transition to a new system (which is common to all reforms), many of these features are shared by a funded scheme. However, advocates of notional accounts argue that they have desirable insurance properties if the volatility of the 'return' on notional accounts (real wage bill growth) is lower than the volatility of return on the funded scheme (which depends on portfolio choice and the capital market). A mixture of funded and unfunded components to the programme may be even better. Therefore, the

Polish proposals, which include both funded and notional account components, were entitled 'Security through Diversity'.⁹

It is the task of this paper to examine these arguments concerning reforms based on notional accounts, evaluating both this collection of claims and the counter-arguments. The next section provides a very brief account of the evolution of notional accounts schemes and their features in Italy, Latvia, Sweden and Poland. However, the central concern of the paper is a generic scheme of this type, rather than the adequacy of its operation in any particular country. The third section examines the *welfare* economics of such a scheme. In particular, it asks in what sense, if any, such a scheme is *'fair'*, a term often used by notional accounts' proponents. This section also examines the *insurance* aspect of providing at least some component of the pension programme in the form of notional accounts.

Section 4 focuses on macroeconomic issues. First it examines the issue of *fiscal sustainability* and asks whether notional account systems do in fact provide a better framework than a 'conventional' unfunded, defined benefit plan. Here I have particularly benefited from the detailed analysis in Valdés-Prieto (1999) and the summary discussion of Schwarz and Valdés-Prieto (1999). The section also re-examines the issue of political credibility raised previously. Section 5 then examines microeconomic issues, and in particular the argument that greater transparency affects retirement and scheme participation incentives. Section 6 concludes. Its main finding is that, despite politically attractive features, the superiority of a reform based on notional accounts over a combination of 'parametric' reforms and the switch to an explicitly funded component remains unproven. Indeed the latter, combination strategy is likely to be superior.

2. Notional accounts: evolution and implementation

Background: Buchanan's proposal and 'point' systems

As Valdés-Prieto (1999) points out, an early proponent of a scheme resembling notional accounts was Buchanan (1968). He suggested replacing social security payroll taxes in the United State by mandatory individual purchases of social security 'bonds'. When the individual retired, these bonds would be credited with a rate of interest compounded over

⁹ Hausner (1998) and Office of the Government Plenipotentiary for Social Security Reform (1997).

the working life. This notional return would be the larger of the rate of interest on long-term US Treasury bonds or the rate of growth of GNP. This accumulation of bond purchases with credited interest was the individual's 'notional capital'. However, and in a key contrast to subsequent schemes as implemented, at retirement the individual would have to purchase a *variable annuity*, with annual payouts related to the subsequent rate of growth of GNP. This would take care of subsequent shocks that affected the capacity of the fiscal system to deliver pension benefits. It would have been a natural extension to make an explicit Aaron-Samuelson condition the criterion for crediting interest and for determining the value of the variable annuity at any point in time. It is to be presumed that the absence of any demographic pressure together with the potential complexity of the proposal precluded any extended discussion of the proposal in that period. Boskin *et al.* (1988), however, did subsequently propose a scheme of unfunded 'personal security accounts' for the United States in which annuity rates would be guaranteed but explicitly linked to long-term actuarial projections and prospective economic conditions.¹⁰

Valdés-Prieto (1999) also points to a second, indirect, source of the idea of notional accounts, in the 'point'-based systems underlying unfunded pension schemes in France since 1945 and the current national scheme in Germany since 1992. In each scheme, contributors accumulate personal 'points' and the pension is determined in large part by the accumulated sum of points at retirement. In Germany, the number of points accumulated in each year depends on the ratio of an individual's wage relative to the average wage in that year. In France the prospective annuity value of each year's points is set in each time period by reference to some concept of fiscal balance in each pension institution. In both schemes, points are converted into a pension at retirement, which is subsequently revalued in line with average *net* wages in Germany (net of social security contributions) and by prices in France. In the German case, there is a mechanism by which the pension conversion incorporates forecast changes in average life expectancy at age 65 but the demographic adjustment is only partial. The French scheme revalues points in line with current financial solvency. But the

¹⁰ There has, however, been growth in employer-run pensions with a formula similar to notional accounts in the United States. Employer and employee contributions accrue in an individual account which earns a notional interest rate. These schemes, known as cash balance plans, are financed in the same way as defined benefit plans: the employer is responsible for making good any shortfall in the fund, in this case between the actual rate of return earned in the market and the notional return credited to pension accounts. See Schieber, Dunn and Wray (1998) for a discussion.

measure of solvency is not linked systematically to demographic change and therefore to long-run sustainability.

The final influence on the development of notional accounts is, of course, the introduction of individual retirement saving accounts as part of a comprehensive social security reform in countries such as Chile and the United Kingdom. In the United Kingdom, for example, individuals have been allowed to opt out of a part of the social security system since 1988. Instead, part of their payroll tax contribution is credited to an individual account known as a personal pension. (Indeed, most reforms based on notional accounts in practice do contain a small component of funded individual accounts in addition to the unfunded accounts.¹¹)

Italy

The case for reform of public pensions was apparent in Italy long before a sequence of reforms was enacted starting in the early 1990s. Prior to 1992, excessive accrual rates under the 'normal' public pension programme, coupled with generous additional incentives known as 'seniority pensions' had combined to push effective contribution rates to over 30 per cent with the system still running a deficit. Projected demographic ageing suggested contribution rates rising to 45 per cent; restoring actuarial balance would have shifted the equilibrium contribution rate above 50 per cent once the 'baby boom' generation retired *en masse* (see Cozzolino and Schioppa Kostoris, 1995).

The first set of reforms (the 'Amato' reforms of 1992, named after the then Prime Minister) were a standard 'parametric' response to the problem, with an explicit increase in the retirement age, cuts in accrual factors, indexation arrangements, and so on. The second set of reforms (the 'Dini' reforms of 1995) attempted to establish a different form of pension provision, by linking benefits much more closely to contributions. Whereas the Amato reforms retained a notional defined benefit structure, while cutting accrual rates, rising retirement age *etc.*, the Dini reforms explicitly made pension entitlements conditional on the accumulated sum of contributions paid. The contributions would be revalued in line

¹¹ The Chilean reform is well known; for a discussion of changes in the United Kingdom, see Disney and Whitehouse (1992) and Whitehouse (1998). For an overview of transitions to funded individual account-based pension schemes, see Palacios and Whitehouse (1998).

with a moving average of GDP growth, and the annuity would be calculated as a product of this revaluation and a 'transformation coefficient' conditional on the age of retirement. The latter should also reflect the predicted average longevity of the cohort and expected productivity growth. The marginal accrual would rise with age of retirement. Subsequent pensions would be indexed in a standard fashion: either to earnings growth or price inflation, with a presumption that the system would ultimately index to the latter.

The scheme also tidied up various other features of the existing system (for example, the rather more privileged position of some public sector workers). Although the new system was implemented in January 1996, all individuals with 18 years of contributions at that time remained under the old scheme. People with between 1 and 18 years of contributions will retire with a weighted mixture of pre- and post-reform benefits. Thus the transition period from the old to the new scheme was extremely long.

There are three reasons for thinking that the Dini reform may not eliminate the risk of fiscal crisis in Italy arising from excessive pension expenditure. First, the long transition period means that the unsustainability of the existing system will continue to dominate pension finances for many years to come. Second, the 'transformation coefficient' at annuitisation fixes the pension. Any unexpected adverse assumptions post-retirement (such as slowing productivity growth or increasing longevity) would have to be borne by the general taxpayer. And third, while the original scheme was already in deficit on 1995, under the Dini reform, individuals would be credited with a marginal contribution based on the 'equilibrium' contribution in a pay-as-you-go scheme. Actual contribution rates were lower, falling short of the level required to balance the existing scheme's finances (see Hamann, 1997). In the light of these developments, further attempts to reform the programme have been made in 1999 in order to accelerate the implementation of the 'contribution-based' scheme.

Latvia

Latvia was the first country to introduce a pension reform based explicitly on notional accounts, in 1995-96, although the developments there were strongly influenced by those involved in the subsequent Swedish reform (Fox and Palmer, 1999). This reform, which replaced a standard unfunded defined benefit programme, was intended to be

multipillar, along World Bank lines. However, the initial focus has been on establishing a basic pillar of unfunded individual pension accounts in which notional contributions accumulate.¹² These accounts are not funded and do not earn a market return. Instead, each individual's 'accumulated' contributions are revalued annually in line with the growth of the contribution base, this being interpreted as the feasible 'return' to an unfunded programme. The reform specifies that an annual statement of the notional pension capital should be provided to each scheme participant.

There is no fixed retirement age in this system of notional accounts, although there is a minimum retirement age and a minimum social pension, which play key roles (see below). At the individual's chosen retirement date, subject to this minimum constraint, the pension level is calculated by reference to accumulated, revalued, contributions on the basis of projected life expectancy at the date of retirement (the average life expectancies are published and are known as the G-values).¹³ By deferring retirement, the individual increases the value of the account and thus the average pension. The gains to deferring are substantial (at least, relative to the pre-existing system): for example a person on average earnings, by deferring retirement from age 60 to 70, increases their replacement rate by 40 *percentage points* (Fox and Palmer, 1999, Table 1). The pension is indexed to prices (from 2000, to a mixture of prices and wages), rather than to subsequent changes in demographic projections or to real wage *bill* growth. Moreover, increases in 1997 and 1998 in fact exceeded price inflation.

Although these features are the core of a programme based on notional accounts, there are other pertinent features to the Latvian reform. First there is a minimum social assistance pension as a 'safety net' after age 55 (women) and age 60 (men). Secondly, there are credits to the system for specified non-contributory periods including military service, time spent in higher education, periods of sickness and unemployment, child care, and so on. General tax revenues cover these and, presumably, other immediate transfers to cover existing liabilities under the old system. It should be noted that the minimum pension, in particular, is substantial relative to the average contributory pension. The minimum pension

¹² The current (1999) 'social tax rate' is around 35 per cent, although it has to be assumed that not all of this is to be attributed to the Notional Account for retirement provision, since existing liabilities and other expenditures such as disability must also be covered.

¹³ This looks like a simple application of actuarial tables but in fact it is straightforward to show that different assumptions as to future mortality, indexation, survivors' benefits and so on generate widely differing notional replacement rates at retirement.

is around 26 per cent of the average wage while the pension for a full career on average earnings covers 40 per cent of pay. Since the eligibility requirements for the minimum pension are fairly lax, the marginal return, in terms of additional pension, from further contributions above the minimum is rather low, especially for low earners.¹⁴

What happens if there are forecasting errors concerning life expectancy? Under the Latvian programme, the G-value is set for any cohort of retirees and this determines the real value of pension benefits thereafter. Any unexpected increase in longevity, for example, has to be covered from other government revenues, rather than by any revision in the value of the 'points' or through the provision of variable annuities, as in the Buchanan scheme. Thus there remains substantial potential for intragenerational redistribution within the scheme and potential net fiscal liabilities. These general issues are discussed further in later sections of this paper.

There are also provisions for the subsequent development of a choice-based funded pillar, by which younger individuals will have the option of transferring a fraction of their contributions to a fully funded scheme of individual accounts. Legislation was passed in 1998 to introduce a regulated pillar of voluntary retirement saving and it is intended that this framework will be extended to the development of a funded component to the mandatory system (Fox and Palmer, 1999).

Sweden

The Swedish pension reform was initially proposed in 1994 but it was not until 1998 that the majority of the required legislation was passed (Palmer, 1999). Since Latvia appears to have been the 'test bed' for the Swedish reform, it is not surprising to find many similar features. Again, the social security program will be composed of a means-tested 'guarantee pension' and an 'income pension' on top. The latter takes the form of a system of individual notional accounts, into which contributions proportional to earnings (between a floor and a ceiling) are paid, totalling 18.5 per cent of payroll. Of the 18.5 per cent total, 2.5 percentage points will be invested in private funded accounts. The remaining 16 percentage points will

¹⁴ The minimum pension is triggered by ten years' contributions but cannot be received until 55/60. Nevertheless a full contribution history for 40 years on average earnings will therefore only increase the replacement rate by 14 per cent. The increase for someone with an incomplete contribution record or below

continue to finance pay-as-you-go pensions. These contributions will also be credited to workers' notional accounts, earning them a pay-as-you-go pension right. An imputed rate of return will also be credited to the account. Again, there are provisions for 'imaginary' contributions from the public budget for periods of economic inactivity during the lifetime: for women bringing up young children, spells of unemployment, sickness and disability, periods of military conscription and post-school education.

The imputed rate of return credited to the pay-as-you-go component of the notional account pre-retirement is indexed to average earnings growth. The funded component will of course earn the actual, market rate of return. There is no reason why the returns on the two components should coincide. On retirement, the unfunded component is converted to an annuity value using a formula, taking account both of the age of retirement and also the expected average length of life at retirement: the 'G-value' again. A public agency (rather than a private annuity provider) converts the funded component into an annuity separately, but simultaneously.

Benefits in retirement are not simply price or earnings indexed, as in 'traditional' defined benefit social security programs and the Latvian example, but are indexed by a formula which takes account of any deviation of real wage growth from a growth 'norm' (to be set at 1.6 per cent).¹⁵ Given the earlier discussion, these calculations are designed to adjust generational rates of return to the underlying sustainable growth rate of the economy. However, while demographic and productivity shocks during the lifetime can be absorbed by adjustments to the revaluation of contributions and by the calculation of the 'G-value', once annuitised the scheme member is insured against demographic shocks in the form of changes in longevity. This 'risk' is borne by the public budget. Finally, the system will be introduced gradually but retrospectively, such that individuals born between 1938 and 1953

average earnings will be smaller or zero. Although there are currently (dis)incentives to early (late) retirement in the Latvian scheme, they do not seem particularly large, especially for low-income earners.

¹⁵ Sundén (1998) provides an example. Suppose inflation is 2 per cent p.a., and actual real wage growth is 0.5 per cent p.a. Then actual indexation is $(2 - (1.6 - 0.5)) = 0.9\%$ p.a. Of course were the longevity adjustment to be incorporated to pensions in payment as well as at retirement (as was apparently originally proposed), then the evolution of the pension will be determined by the indexation formula and the longevity improvement, i.e., $P_t = [P_{t-1}(1 + \pi_{t-1} + w_{t-1} - w^*)]/(1 + \Delta G_{t-1})$ where P is the pension, π is the rate of price inflation, w and w^* are the actual and 'norm' rates of earnings growth and ΔG is the effect of any longevity improvement on the 'G-value'.

obtain increasing proportions of their retirement income from the new system by year, with cohorts born after 1953 fully participating in the new scheme.¹⁶

Poland

Radical pension reform was first proposed by the government in 1995; the current legislation was implemented in 1999 (Chlon *et al.*, 1999). Under the existing (pre-reform) scheme, employers paid 45 per cent of wage bill (plus a subsidy of approximately 1.5 per cent of GDP from general revenues) to finance retirement, disability and other benefits. The reformed scheme again has a multipillar aspect, with a mandatory unfunded component, and smaller mandatory and voluntary funded components. However, despite the smaller contribution to the funded part, the government expects in the long run that the average pensioner will derive half their income from this source because of the higher return.

The key proposal is to reconstitute the existing unfunded defined benefit plan as a notional account scheme, supplemented by a component that will be paid into a funded account. Since there is also a reallocation of contributions, with part of the notional incidence now being borne by the employee, a comparison with the existing scheme is not straightforward. Under the new scheme 12 percentage points of the combined payroll tax rate will be diverted to an individual's notional account, 7 percentage points to the second tier funded account, and the remaining 21 percentage points used for other benefits (such as disability benefits). Participation in the funded pillar is compulsory for those aged below 30 in 1999 and voluntary for those between ages 30 and 50. The alternative to participation in the funded pillar is a revised transitional benefit from the unfunded scheme. In the medium term, it is assumed that the exceptionally high payroll tax rate can be cut back significantly by switching to a notional account basis plus some pre-funding. However it should be borne in mind that a part of contribution revenue will be diverted to funded accounts (depending on the degree of switching), so that the remaining contributions have to finance existing public obligations. Although in due course this cost may be offset by the implicit reduction in the value of existing accumulated rights (largely by eliminating early retirement) and by

¹⁶ Previously, benefit entitlements were calculated on the basis of a subset of 'best years' earnings: for further details, see Palme and Svensson (1997).

incomplete indexation of notional accounts to real wage growth, substantial switching will require budgetary support from other sources of revenue.¹⁷

As in Latvia and Sweden, the notional account structure works by accumulating contributions in a 'virtual capital account'. In Poland, the sum in the account will be revalued in line with only 75 per cent of wage bill growth. For those already working under the previous pension regime, accrued 'rights' are incorporated as notional 'initial capital' in the national accounts, rather than by issuing separate 'recognition bonds' as in Chile or providing transitional defined benefit pensions as in other reformed systems. The value of this 'initial capital' will be determined by the value of accrued rights obtained under the old system but assuming that everyone retires at age 62, with some further transition arrangements for earlier cohorts of women who would have retired earlier (see Chlon *et al.*, 1999, p.20ff). Each participant will receive regular information on the value of these 'virtual capital accounts' and an estimate of their prospective annuity value on different assumptions concerning retirement age and assumed prospective longevity.

There is a minimum pension age of 60 for women and 65 for men (a common retirement age having previously been proposed: see Góra and Rutkowski, 1998), with explicit increases in pension benefits attached to later retirement (in addition, presumably, to the revaluation of existing 'virtual capital'). As in the other countries, the annuity formula will take account of life expectancy at the time of retirement, rather than on a composite wage-related formula, as in a typical defined benefit plan. Pension benefits in payment will be indexed to price inflation, although procedures can vary if nominal wage growth falls below price inflation or where fiscal performance is particularly good (Góra and Rutkowski, *ibid.*, p.15). There are also provisions for a guaranteed minimum pension financed from other tax revenues, for a contribution ceiling and for contribution reductions for employers that offer an additional contribution to third pillar voluntary retirement saving accounts. Additional credits to notional accounts are offered for periods of unemployment, and care of children or the disabled. Finally, any surplus accrued by the system, and a mandatory 1 per cent of the total payroll tax, will be accumulated in a separate 'demographic reserve

¹⁷ Chlon *et al.* (1999) estimate, that if all individuals between 30 and 50 switch, a deficit of around 1 per cent of GDP will need to be covered from privatisation receipts and debt finance by the year 2014. Note from the comparable evidence provided in Palacios and Whitehouse (1998), Disney, Palacios and Whitehouse (1999) and World Bank (1999), that a high degree of voluntary switching seems likely.

fund', to offset any prospective rise in contribution rates arising from demographic ageing in the future.

Notional accounts schemes in theory and practice

It is apparent from the above discussion that there are some common features to 'notional account' reforms. First, they usually attempt to reduce the degree of variation in implicit returns to pension contributions across members of the *same* generation. Secondly, by linking pension values at retirement to expected longevity, they intend to reduce the degree of variation in returns *across* generations. But there are also substantial differences. First, in indexation or revaluation procedures, both before and after retirement. Secondly, in transition strategies and, thirdly, in the accumulation of 'discretionary' credits to notional accounts that are unrelated to contributions (sometimes called imaginary contributions). In what follows, therefore, the focus is on a 'generic' notional account-type reform, although the relation between principles and country practice will be highlighted on occasions.

3. 'Actuarial fairness' and insurance features of the new scheme

Fairness in pension programmes: intragenerational outcomes

As suggested in the introduction, advocates make a number of claims for notional accounts. For example, Palmer (1999) argues that 'a fundamental feature of the NDC [*i.e.*, Notional Accounts Defined Contribution pay-as-you-go system] is that it is *fair*' (*op. cit.* p.8). Of course, notional accounts cannot be absolutely *actuarially* fair because they do not automatically generate the market rate of return on contributions (Hassler and Lindbeck, 1996). Nor are individuals in the scheme risk-rated (over systematic differences in mortality, for example). The concept of 'fairness' in this context is somewhat different, illustrated in Palmer's paper by two individuals of the same cohort entering the notional accounts scheme at different stages of the life cycle. The contribution-based feature of the scheme, together with the particular revaluation procedure, then ensure that the pension benefits of the two individuals are proportional to the amount of time in and how much that they have

contributed to the scheme.¹⁸ In the terminology of Hassler and Lindbeck (1996), this makes the scheme ‘fairer’ *on the margin*, relative to other pay-as-you-go pension schemes.

To show this, write a basic version of the benefit accrual formula under notional accounts as:

$$p = g \sum_{t=0}^R w_t (I_R / I_t) c \quad (1)$$

where p is the pension value; g is the pre-set conversion factor (related to the ‘G-value’) by which the notional capital is converted into a pension stream; w_t is the wage at t ; I is the appropriate revaluation index (such as the wage bill); and c is the contribution rate. So the value of the pension is a product of three variables set by the government: c , g and I set by the government. The revaluation procedure ensures that the *marginal* return on contributions in terms of increased pension is invariant to timing. Hence, the pension is proportional to contributions (discounted by the revaluation factor, *e.g.* wage bill growth, which is unlikely to coincide with any conventional discount rate). This is the sense in which Palmer uses the concept of ‘fairness’ to describe the scheme.

By way of comparison, we can write down the accrual formula for a benchmark unfunded defined benefit plan in which benefits are calculated on a measure of average revalued earnings. This would give:

$$p = \sum_{t=0}^R a w_t (I_R / I_t) \quad (2)$$

There are two broad differences between (1) and (2). First, the revaluation factors may differ between the schemes: for example, many defined benefit plans use earnings growth rather than real wage bill growth. And they are also often based on sub-set of lifetime earnings. Two-thirds of developing countries and 40 per cent of OECD pension systems are based on ‘final’ pay, ranging from the last month’s to the last ten years’. Another fifth of

¹⁸ Proportionality of contributions and benefits only holds if the discount rate applied to contributions at different times is the same as the notional return. Using the (higher) market rate of return would give a higher weight to early years’ contributions.

countries base pensions on a limited number of 'best' years¹⁹. It is, however, in principle straightforward to adjust the defined benefit pension formula to provide a revaluation procedure comparable to a notional accounts scheme.²⁰

The second, more substantive, difference lies in the substitution of a , the accrual rate, with $g \times c$. The accrual rate is usually determined by some political process on the basis of a target level of generosity of plan benefits. It can vary across time: for example, 50 countries vary the accrual rate so that the first years' contributions (typically the first 10 or 20 years) earn more pension than subsequent contributions. It can also differ according to the level of earnings (as in the pre-1992 Italian system and the US social security programme). Given a target level of the pension, the contribution rate can be 'solved' to generate pay-as-you-go equilibrium, where contribution revenues and benefit payments are equalised at each point in time. (Otherwise there will be pay-as-you-go deficits or surpluses that might require support from other sources of taxation.) Thus the contribution rate does not appear directly in the benefit formula in (2).

Under what circumstances do notional accounts and a defined benefit plan generate the same outcome? Clearly, if accrual rates vary over the lifetime or across earnings, there will be divergences between the plans. Differences can also result if the measure of earnings on which the defined benefit pension is based does not fully incorporate full lifetime earnings, or if there are ceilings, floors and minimum eligibility periods. Of course many of these are also found in notional accounts systems, as the discussion of individual countries in the previous section made clear. But a 'pure' defined benefit plan in which pensions are based *only* on revalued lifetime earnings satisfies exactly the same 'within generation' criterion for fairness as 'pure' notional accounts. The difference is that, in a notional defined contribution account, the accrual rate is expressed as a notional interest rate and tied to the real productivity growth of the economy during the working lifetime rather than by some political process underlying a target replacement rate.²¹ If this is the only *generic* difference between the two schemes, then it is the *intergenerational* incidence of the programme that is

¹⁹ Disney and Whitehouse, 1999, Tables 1 and 2.

²⁰ This may, of course, be politically difficult, given that there are likely to be clear losers from such a reform, but there is no guarantee that a switch to a notional accounts basis will prove any more politically tractable if it generates an identical outcome.

²¹ In fact, even this is not true in Poland, since the notional accounts will be revalued at a rate of only 75 per cent of real wage bill growth.

affected by the accrual rate, not its *intragenerational* (within generation) incidence. In which case, the primary difference between a 'parametrically' reform defined benefit plan and a notional account scheme lies in how well, and in what way, the marginal accrual/notional interest rate distinction is understood by members of the scheme. Any differential impact of a standard 'parametric' reform and a 'notional account' scheme, or differences in political feasibility, then arise merely because this equivalence is not well understood, at least initially.²²

Fairness in pension programmes: intergenerational outcomes

What of the use of the term 'fairness' in the treatment of different generations, *i.e.*, in the intergenerational sense? Samuelson (1958) postulated that a 'fair' social contract between generations could in principle exist in the context of a 'consumption loan economy'. Such an economy had no storage possibilities (or storage costs, implying a negative return on a 'funded' scheme). By agreeing to a scheme of within-period transfers between generations, each generation could potentially 'earn' a return equivalent to the rate of growth of the labour force. Aaron (1966) extended this line of reasoning to point out that potential return on an unfunded transfer scheme could be the sum of labour force and productivity growth.

It should be noted that this is not the only criterion of 'fairness' that could be applied in intergenerational comparisons. For example, it is *not* compatible with the utilitarian perspective, in which the marginal utility of consumption is equated across generations – see Samuelson's debate with Lerner in 1959. Nor is it compatible with a purely within-period redistributive framework in which the marginal utility of money is equated across heterogeneous households.²³ Nevertheless, Samuelson's point was that this was the return that would be compatible with the optimal consumption allocation across periods for each representative-agent generation.²⁴ Of course, in the real world, there are durable goods and

²² As one Swedish expert explained, "A consequence of the political strategy chosen is that... the changes necessary to make the system financially sustainable are 'concealed',... A downside of the approach described here is that the "losers" only gradually realize what has happened.." See Scherman (1999).

²³ A point recognised in all the notional accounts reforms by maintaining various redistributive features such as differential retirement ages for men and women, various forms of credits for non-participants, and minimum pensions or social assistance schemes.

²⁴ That is, which would equate (discounted) marginal utility across time periods by any generation. With uncertainty added, this becomes the Euler equation underlying life cycle optimal consumption allocations. This

individuals can 'invest' in claims on future income flows from owned assets. If the returns on these claims (approximately derived from the marginal product of capital in the long run) exceeded the underlying rate of productivity growth per head, then a saving (funded) strategy would be superior to the unfunded 'consumption loan' model. In this standard case of dynamic efficiency, any concept of 'fairness' in the long run would surely suggest adopting the funded strategy: the real question would become one of sharing the transition burden of moving from an existing unfunded scheme to a funded scheme across generations.

A further major concern in Samuelson (1958) was whether any means could be found of implementing 'intergenerational social contracts' of this type in the absence of real claims (storable goods in his framework). This is the problem of commitment, which has resurfaced in many areas of economics, here arising because future generations cannot be committed to any institutional arrangements agreed by current, living, generations. Only if there are design features that make reneging on pre-commitments costly (for example, costs to changing institutions, or the possibility of punishment strategies) can contracts of this type be enforceable, and it is hard to think of plausible mechanisms with unfunded social security.²⁵

All this of course sounds rather abstract in the context of social security in the real world, and notional accounts in particular, but it is in fact highly pertinent. First, because it provides some logical basis on which to talk about 'fairness' and, secondly, because the pre-commitment problem seems very relevant to schemes based on notional accounts. The key parameters in a notional accounts reform that impinge on intergenerational fairness are the conversion factor relating notional capital and the annuity value of the pension (the 'G-value') and post-retirement indexation of benefits. These are essentially political decisions, not governed by the design mechanisms that are designed to 'lock' notional accounts participants into an 'actuarially fair' scheme.

In the first case, it is easy to demonstrate that 'G-values' are highly sensitive to assumptions concerning expected mortality and rates of return and offer plenty of scope for governments to 'cheat' on particular generations.²⁶ In the second case, any notional

is an 'optimal' allocation from the point of view of the consumer, which was Samuelson's point, but not necessarily a socially 'fair' allocation without further analysis of what constitutes 'fairness'.

²⁵ See Estaban and Sákóvics (1993). For further discussion and references, see Disney (1996) Chapter 9.

²⁶ For an illustration in the case of Poland, see Whitehouse (1997), Table 1 and the discussion thereof.

reevaluation of contributions and post-retirement indexation of benefits according to a formula that takes account of changes in productivity and longevity is unlikely to be transparent to benefit recipients. So it would be highly susceptible to political pressures, not least because procedures governing the indexation of benefits in retirement are among the most intrinsically overt components of the social security system.²⁷ In particular, any program that seriously proposed to under-index pensions to price inflation (by applying some formula of the type described in footnote 14 on Sweden above) is likely to run into stiff opposition from recipients and workers alike. At the same time, with a separate funded component that is presumably earning the average rate of return in the capital market, workers would be likely to press for the unfunded component also to earn that return. Consequently, it is hard to believe that applications of abstract formulae to benefit indexation decisions can be sustained, whatever the concept of 'fairness' which provides the underlying rationale.

There is a further point. The early growth and overlapping generation models that underpinned these models of 'optimal' pay-as-you-go financing of social security have been supplemented by, if not superseded by, the endogenous growth literature. The main feature of the literature is, in essence, that productivity growth is not exogenously determined. Instead, it depends on the value of investment in physical and human capital. Increased investment, as a consequence, for example, of funding social security, may raise the productivity of capital such that the decline in the marginal product of capital (rate of return) associated with capital deepening is largely offset. In similar vein, investment in *human* capital (education and training) should ultimately raise the productivity growth rate of the economy. In an overlapping generations context, it is possible to think of each generation facing a choice between maintaining an existing unfunded social security program or of investing in raising the long run growth potential of the economy. With an economy's productivity growth in effect endogenous to the method chosen to finance pension obligations, any social security 'arithmetic' based on identifying an exogenous rate of productivity growth in determining the accrual of pension liabilities is an irrelevance.

²⁷ For example, as mentioned above, in 1997 and 1998, in the face of an election and improved public finances, pensioners in Latvia were given real increases in pension, despite the law providing for only price indexation. Poland, too, has uprated pensions more slowly or quickly than the formula in the light of developments in the public finances.

This section has therefore given some analytical basis to the concept of intergenerational ‘fairness’. While it is undoubtedly true that existing social security programs have benefited early generations disproportionately, the idea of linking the ‘return’ to subsequent generations to some real productivity growth condition is problematic for at least three reasons. First, unless there is dynamic inefficiency, then by forgoing the opportunity of obtaining the marginal product of capital (rate of return) through funding, the economy is incurring a first order welfare loss. Secondly, there are no credible pre-commitment mechanisms in unfunded social security: the key parameters in notional accounts that are held to ensure intergenerational equity are in fact far from transparent and are subject to political manipulation. And third, in a dynamic economy, almost all the key indicators of ‘sustainability’ to which the returns on notional accounts are tied are endogenously determined. Higher investment (saving) in physical and human capital, which may be associated with funding in equilibrium, may in fact change the underlying potential growth rate of the economy, which was held to be the ‘constant’ underlying the formula underpinning pension determination in the unfunded system.

Is there an insurance argument for unfunded individual accounts?

Although dynamic efficiency might suggest that a system of funded individual accounts is superior on expected rate of return grounds, some have argued that there is an insurance motive for combinations of funded and unfunded individual accounts. Such schemes, it is argued, contain superior portfolio diversification properties to schemes that are wholly funded (this underpins the title of the Polish reform proposals). The implication is that risk-averse individuals might wish to have a pension scheme containing both components.

The rationale for a diversification strategy governing individual accounts rests on assumptions concerning *portfolio risk*. From an individual perspective, a mix of funded and unfunded pension provision will increase welfare if the risk reduction property of the balanced portfolio outweighs the loss of return from sacrificing dynamic efficiency by not choosing a wholly funded scheme. However, this case for mixed financing does *not* depend on the relative magnitudes of the variances of individual returns in the portfolio. The fact that investment returns in a funded scheme may be volatile *per se* is irrelevant. Instead, the

key issue is the *covariance* of investment returns in the defined contribution plan and the implicit 'return' in a defined benefit plan (*i.e.*, in an approximately actuarially fair plan, the rate of growth of the wage bill). Negative covariance is ideal for a diversification argument; but positive covariance reduces the gain from diversifying across pension schemes. On intuitive grounds, positive covariance seems the more plausible outcome if, in the short run, profit *share* and productivity growth are both pro-cyclical, while in the long run, a falling marginal product of capital is associated with declining labour force growth. Ultimately, this is an empirical issue. Palacios (1998) finds little evidence in various countries over time of covariance between equity returns and productivity growth.

A more fundamental issue, however, is whether there is some financial asset, the return on which is perfectly covarying with the implicit return in an unfunded scheme, such as a bond yielding the riskless rate of interest. If this is the case, then there is no need for a residual unfunded component to income replacement irrespective of covariance structure. Indeed the original Buchanan (1968) proposal suggested mandatory purchases of a social security bond indexed to real wage growth. A superior insurance strategy would surely be to fund the social security system but for the government to provide bonds indexed to real wage bill growth. People who felt that they could obtain superior insurance against the volatility of investment returns could buy these bonds. Given this solution, the 'diversification' argument for maintaining an unfunded component to individual accounts seems to have little rationale.

4. Macroeconomic aspects of notional accounts

Fiscal sustainability

Another key argument for notional accounts, in the eyes of advocates, is that they assist in realising fiscal sustainability. For example, Palmer (1999) writes:

"A goal of the Swedish reform is to create *long run* [my Italics] financial sustainability, even in the face of extremely adverse demographic and/or economic developments. Financial stability in its strictest interpretation means that the contribution rate can remain *fixed* [again, my italics] over all coming generations... Consequently there will no longer be a need – or an excuse – for politicians to intervene for financial reasons" (*ibid.*, p.5)

There are a number of issues here, which can be brought out by a comparison with the two other reforms mentioned in the introduction. First, a parametric reform achieves

sustainability by changing the scheme's generosity or, if that fails, by changing the contribution rate in the long run. In contrast, a fully-funded scheme avoids the problem of financial sustainability in the face of shocks by ensuring that there are assets to match exactly the liabilities at each point in time, with demographic shocks (e.g., changes in the average length of life) borne by the insurer.

In a notional account system, the independence of the scheme's commitments from shocks is, it is argued, brought about by the formula-driven adjustments to benefits which permit the scheme to replicate the internal rate of return consistent with financial sustainability. For example, an adverse demographic or productivity shock leads to revisions to the prospective annuity, via the revaluation procedure and the application of the 'G-value' to calculate the annuity at retirement, such as to ensure internal equilibrium. However, for this requirement to hold strictly, contributions must be revalued in line with the growth of the contributions base, and post-retirement, the 'G-value' must be altered continuously in line with prospective changes in longevity and the contribution base.

Among the countries that have implemented the reform, only Latvia appears to have adhered strictly to the first requirement. Indexing contributions to *real earnings growth* is not sufficient, if, for example, there is a fall in the size of the labour force (due, say, to past falling birth rates). This leads Hamann (1997), in his discussion of the 'Dini' reform in Italy, to argue:

"Whereas an actuarially fair pay-as-you-go system would exhibit a balanced cash flow with a constant population growth rate, it would still run deficits during a demographic transition. Therefore the Dini system is not explicitly equipped to deal with one of the most pressing issues of Italy's public finances over the next four or five decades: a significant deterioration in elderly dependency ratios" *ibid.*, p.21.

An additional problem in Italy, as mentioned previously, is that each individual is credited with the contribution that would approximately sustain fiscal balance although the actual contribution levied is less than that. This means that the scheme is already explicitly in deficit relative to pay-as-you-go balance.

Turning to the second issue — the adjustment of the annuity in line with subsequent revisions of forecasts concerning longevity and productivity growth — none of the reforms appear to deal with this problem. This is a serious omission, because individuals retiring at,

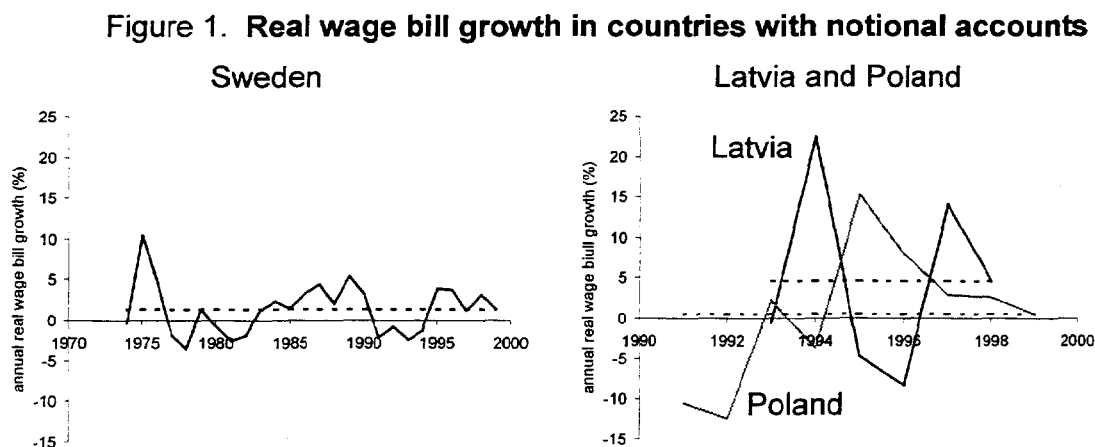
say, 60 can expect to live for perhaps 25 more years on average, and 25 year periods have seen substantial upward revisions in life expectancy. For example, in the United Kingdom, the official projection of the number of retirement pensioners in the year 2025 has increased by around 40 per cent in a period of twenty years from 1975 to 1995. The construction of confidence intervals around population projections for the United States by Lee and Skinner (1999) illustrates the point. Furthermore, all the forecasting errors that occur seem to have been one-sided – overstating retirement age and understating length of life. If no *ex post* adjustment to the actuarial formula is made, the costs will be borne by rising public deficits or rising contribution rates. Thus the scheme will have to resort to ‘parametric’ reforms to restore financial sustainability.

In contrast, how does the private market deal with unexpected increases in longevity? Although the recent experience with fixed rate annuity contracts in the United Kingdom suggests that private markets may also have difficulty in forecasting longevity, there are adjustment mechanisms in the private sector. One is a reinsurance market. The second is that insurance companies may also provide life insurance, which may have portfolio insurance properties when there are unanticipated increases in longevity.

Notional accounts systems may not automatically absorb long run demographic and productivity shocks without changes in the contribution rate (just like a defined benefit scheme). But they might have better short run properties than traditional defined benefit schemes that lack explicit stabilising mechanisms. Some analysts who are nevertheless critical of the long-run stability properties – such as Hamann (1997) – largely accept this argument. Others are less convinced. Valdés-Prieto (1999) argues that it is only under extremely restrictive conditions – basically, constant demographics and productivity growth – that fiscal stability can be continuously maintained by a ‘pure’ notional accounts system. The reason is intuitive: such a scheme attempts to ‘mimic’ a funded plan by accumulating notional capital over time that is then revalued by some parameter designed to approximate the evolution of fiscal sustainability over time. But this scheme constitutes neither a funded equilibrium, nor a pay-as-you-go equilibrium in which commitments must equal revenues *at each point in time* (in which case, past history is irrelevant). In this sense, he argues, a ‘traditional’ pay-as-you-go scheme is more transparent because outgoings must equal revenues in each period. So, it is soon apparent that sustained deficits must be eliminated by

benefit cuts or contribution rate rises. If the built-in stabilisers in the notional accounts scheme (the revaluation procedure and the 'G-value') do not 'work', in the sense of maintaining fiscal balance, then the scheme does not have direct recourse to the standard ways of restoring pay-as-you-go equilibrium. Any effective solution would question the credibility of the whole notional accounts scheme. I return to the issue of credibility shortly.²⁸

Notional account schemes rely on the relative constancy of the parameters that underlie the revaluation factor and the calculation of the 'G-value'. A natural question is how stable are these factors in practice? I abstract from demographic shocks, which have been discussed previously. Figure 1 shows real wage bill growth for Sweden for 1973-1998 and for Latvia and Poland for the shorter periods during which adequate statistics have been collected. (The charts have the same scale.) Since it is implicit that the revaluation is undertaken year by year, these annual changes should approximate those that were implemented in these countries had their notional account schemes been in place over the period.²⁹



Source: OECD Economic Surveys of Sweden, various years and IMF *Financial Statistics*

²⁸ Hassler and Lindbeck (1997) take a slightly different line of argument. They argue that an 'actuarially fair' pay-as-you-go scheme is only viable (with constant growth and constant rate of return) if there is dynamic *inefficiency*. They also show that, when a balanced budget is assumed, a variety of types of pay-as-you-go schemes can generate their version of 'actuarial fairness'.

²⁹ As mentioned earlier, Poland only revalues to a constant fraction of real earnings growth.

For Sweden, wage bill growth averaged around 1.4 per cent over a 25 period, approximately the same as the 1.6 per cent growth norm used in official calculations. There are periods with a sequence of years below the average and at least one year, 1975, with a dramatic positive residual. However, the chart suggests that trend and volatility do not appear to be major issues in Sweden. Contrast this result with Latvia and Poland, which are not untypical examples of transition economies. There has been immense volatility in real wage bill growth in both countries in the recent past. For what it is worth, the average annual wage bill growth in Poland barely exceeds zero while in Latvia it is above 4 per cent. But it would be foolish to invest much trust in either of these as a long-run measure given apparently negative labour force growth in both countries in most recent years. So specifying a norm for wage bill growth to use in notional accounts calculations is very difficult.

Faced with this volatility and the absence of a meaningful average ('long-run') growth of the real wage bill, one option would be to chose to credit notional accounts each year with the *current*, actual rate of real wage bill growth. But then workers would be exposed to a good deal of uncertainty, probably just as much as investment returns. So linking revaluation to a volatile series provides no more insurance than would be provided in a funded scheme.

One possible feedback mechanism is for the scheme to smooth out short-term fluctuations in wage bill growth by establishing a small accumulated fund. Higher than expected wage bill growth will lead to prospective faster revaluation of benefits but it also permits a faster growth of revenues. A partial fund can be used to dampen fluctuations in real wage bill growth, but this requires incomplete linking of annuity values and revaluation to the real wage bill (as in the case of Poland). The risk of such a strategy, however, is that the pension authority confuses the cycle and trend. If a trend change in growth occurs, while the government perceives this change as fluctuations around an underlying constant rate of growth, the system will soon generate cumulative surpluses or deficits. Again this casts doubt on the rationale for such a scheme that it avoids any impact of changing demographics and productivity on fiscal sustainability

Credibility in notional account pension schemes

A feature of notional accounts, it is claimed, is that they give people explicit 'property rights', in the form of individualised claims on future tax revenues. This *transparency* of notional accounts schemes is more illusory than real, however, without any fund to back those claims.³⁰ There is much scope for argument as to whether such claims are likely to be perceived as any more 'real' than prospective benefits in pay-as-you-go defined benefit schemes. In the latter, individuals are given a generalised commitment to replacement of earnings; in the former, people are given an individualised claim to a fund with an annuity that will be unknown until after conversion. Both are subject to uncertainty and the risk of effective tax rises and/or benefit cuts. When the government, rather than the insurance company, acts as the guarantor, the issue of government credibility is a central question. Scherman (1999) makes this point from the Swedish perspective:

"The fact that pension rights are credited to individual accounts does not introduce a new element. In the old system all such rights were maintained in individual records, this was seen to guarantee the benefit 'promises' in the 1950s and 1960s, when the system was introduced. Time has shown that such types of promises can be changed when political preferences change or financial realities require modifications. The same can happen in the new system."

There is a parallel here with the issue of credibility in macroeconomics. Policies such as central bank independence are designed to avoid the necessary conflict between what is expedient for the government in the short run — for example, stimulating output above the equilibrium level through money supply increases — and what is a consistent policy in the long run — keeping output at its equilibrium level. Such models rely on asymmetric information between the government and 'the public', on the government and the 'public' having different preferences, and on the public anticipating that the government will renege on its promises. In the face of these features, central bank independence 'gives' the government credibility and thus allows it to achieve its goal of stabilising the price level.

The parallel in the context of unfunded public pension schemes might be that, by introducing 'rules' (in particular, a pre-set procedure for determining pension benefits that can be observed continuously by the public), the scope for short term variations in pension

³⁰ In fact, as Scherman (1999) points out, in Sweden "The reality of the new Swedish system is that contributions, as the law is formulated, are set independently of pension entitlements just as in every PAYG defined benefit scheme... This law as such does not prevent an increase (or decrease) in contributions without affecting pension rights."

generosity (for example raising benefits, lowering retirement age) is precluded. This, it might be argued, permits long term planning of pension schemes in the face of demographic change rather than *ad hoc* adjustments, frequently blocked by interest groups and by politicians courting short run popularity. It takes the 'insurance' aspect of the scheme out of the hands of politicians (see the earlier quote from Palmer, 1999).

Even if we assume that the mechanisms implemented with a notional accounts reform do achieve this goal, and are perceived as credible by the public, on which there are some grounds for scepticism based on past experience,³¹ there are nevertheless intrinsic problems in the strategy. The first is that it fails to address the fundamental issue that unfunded pension schemes are intrinsically intergenerational transfer mechanisms that involve resource redistribution. Declining fertility, the retirement of the 'baby boom generation', and changes in underlying productivity growth all involve possibly disparate burdens across generations that have to be addressed in the political arena. They cannot simply be finessed away by applying complex revaluation procedures and rules concerning annuitisation. Transparency means that policy-makers have to be open to the public as to what is feasible and what is not. All notional accounts reforms have been introduced as compromises to placate interest groups that were reluctant to accept that the generosity of existing defined benefit plans was no longer feasible. I am not suggesting that those involved in this type of reform were unaware of this point (indeed it is explicit in all the sources cited here concerning individual countries), merely that compromises cannot be dressed up as principles.

Secondly, there is a major danger in locking the public finances into individual commitments where there is neither the financial capital (funding) nor the political capital to guarantee that the promised benefits will eventually be paid. Whatever the uncertainty governing investment returns in funded schemes, this is the basic difference between a funded and an unfunded scheme. If the financial sustainability of notional accounts programmes cannot be guaranteed (as suggested in the previous section, and more emphatically by Valdés-Prieto, 1999) then the government is faced with a stark choice. Either it has to carry potential deficits elsewhere in the budget, or else it has to adjust the parameters of the notional accounts programme *ex post*, so reducing the explicit value of its

individual promises and damaging, perhaps fatally, the credibility of the whole scheme. The lesson from the macroeconomic literature is that government policy credibility is hard won but can easily be lost.

5. Microeconomic aspects of notional accounts

A further argument concerning notional accounts is their impact on incentives to retire and more generally to participate in paid work at any age. There is an uncontentious argument that many existing unfunded schemes permit individuals to retire too early, while there is no such incentive with 'pure' notional accounts. Furthermore, notional accounts adjust benefit formulae to take account of rises in longevity. Of course, 'parametric' reforms to unfunded schemes can achieve the same effect by, in the short run, simply by raising retirement age and, in the long run, by linking retirement age explicitly to expected longevity. Alternatively, the pension replacement rate can be adjusted with increases in life expectancy, as in the recent reforms in Germany.

However, a strong case for individual accounts (whether funded or unfunded) is that, rather than legislating when people can retire, they offer the individual the chance to choose when to retire. This allows much greater flexibility in work patterns and forms of exit from the labour market, a point rightly stressed by Fox and Palmer (1999) and by Palmer (1999). An important issue, however, is whether similar incentives can be built into a defined benefit plan.

There are two further initial observations. First, there is usually a 'parametric' element to notional accounts reforms, in that they apply a minimum retirement age (see Section 2 above). This pensionable age usually exceeds the age at which some (or even most) people retired before notional accounts. This restricts choice, although this limitation is perhaps desirable. Secondly, choice will also be distorted by other parameters of the tax and benefit system, including any minimum income guarantees, disability benefits, and so on. The development of a system of individual accounts cannot be undertaken separately from a (probably parametric) reform strategy of these components of the overall system.

³¹ As Palmer (1999) writes: 'Social security reforms are inherently political, and in the end inevitably represent compromises among various political interests. The Swedish reform is no exception.' (*op cit.*, p.1)

Fox and Palmer (1999), however, make a stronger case for a framework based on notional accounts:

“As benefits [in the Latvian reform] are completely and fully dependent on contributions in the new system, a large part of the disincentive effect of a traditional social insurance tax disappears. Where benefits are unrelated to contributions, the social insurance contribution becomes a tax, and like any other tax embodies a loss of income and utility to the payee. The closer benefits are related to contributions, the less loss of utility and income the system implies, and the easier administration becomes.” (*ibid.*, p.17)

Leaving aside the issue of administrative ease, the argument underpinning this is presumably as follows. In standard public finance analysis, distortionary taxes (such as those levied on income) generate an excess burden (welfare cost) relative to non-distortionary taxes (lump sum taxes, for example). As Feldstein (1996) points out, the ‘welfare triangle’ gain associated with the elimination of this distortion by linking benefits to contributions in a pay-as-you-go system is of second order magnitude to the gain from *funding* these individual accounts. Financing the system by an inferior mechanism (pay-as-you-go) generates a first order welfare loss in equilibrium. Hassler and Lindbeck (1996) argue that the second order gain therefore depends on the increase in the degree of *marginal* actuarial fairness: *i.e.*, on the relationship between marginal contributions and marginal benefits. In a world with liquidity constraints, raising the degree of marginal fairness will induce workers to increase labour supply, as this is the only means of changing second period consumption. Even in this case, however, the authors show that ‘full’ linking of marginal benefits to marginal contributions does not automatically guarantee ‘actuarial fairness’. It also depends on the relative rates of return to the funded and pay-as-you-go programmes, and the relative rates of time preference of the public and the government.

In a more intuitive sense, the prospective welfare gain from switching from a defined benefit plan to a notional accounts framework relies on the change leading individuals to perceive the pension contribution as a ‘true’ contribution to deferred pay and not simply a payroll tax. This is not self-evident. There is often public confusion over pension financing mechanisms.³² And notional accounts schemes do, in practice, contain a variety of ‘unfair’

³² Consumers of pension products in the United Kingdom have become increasingly sophisticated, given the ability to opt out of social security benefits into a variety of funded, defined benefit and defined contribution alternatives. Nevertheless there is still much public confusion as to pension finance, as illustrated by Whitehouse (2000).

actuarial transfers (benefit floors, contribution ceilings, credits for periods out of the labour force *etc.*).

The retirement decision

An important issue concerning notional accounts is how they affect the individual retirement decision. To consider the value of retirement in a choice-based framework, we can envisage individuals (or households) making a forward-looking decision initially of the prospective utility value of the stream of income obtained from retiring at any particular date. The value of this prospective income flow is (loosely):³³

$$\begin{array}{lcl} \text{the value now of} & & \text{the sum of the stream if} \\ \text{retirement at a future} & = & \text{earned income until } r \times \\ \text{date, } r & & \text{the probability of} \\ & & \text{surviving to } r \end{array} \quad + \quad \begin{array}{l} \text{the sum of pension} \\ \text{benefits from } r \times \text{the} \\ \text{expected length of life} \end{array}$$

The choice as to when to retire therefore depends on:

- the expected length of life;
- the disutility attached to work relative to retirement;
- the expected future value of earnings, net of income taxes; and
- the expected future value of pension benefits.

All these are likely to vary over time. For example the conditional survival probability is likely to depend on whether the individual retires or not and the pension benefit will depend on both the retirement date and the trajectory of earnings. The utility attached to retirement

³³ We can write this formally as evaluating a value $V(r)$ of retiring at date r , which is:

$$V(r) = \sum_{s=t}^{r-1} \beta^{s-t} U_w(Y_s) + \sum_{s=t}^S \beta^{s-t} U_r[b_s(r)]$$

where w =work and r =retirement and U is the utility attached to each state. Y is the stream of earned income, summed up to the year before retirement. β is the cumulative survival probability; thus β^{s-t} is the probability of surviving to year s from any year t . S is the time horizon (longest expected survival date) and $b_s(r)$ is the benefit conditional on this survival date (allowing for, *eg.*, actuarial adjustments) given retirement at r . In the Stock and Wise (1990) model, the individual calculates the 'option value' of each retirement date, in this framework, and chooses the retirement date that maximises the value function $V(.)$.

may also vary over time, although a standard simplification is to assume that this is variation known in advance.³⁴

Consider the decision to work one more year. By working an extra year, the individual gains one more year of earned income and also increases the prospective *annual* flow of pension benefits. Against this, the individual has to evaluate the disutility from having one extra year's work rather than retirement. At some point, the disutility of shortening retirement will outweigh the higher current and prospective annual income derived from deferring retirement.

Different pension plans have an effect on retirement, not just because of different levels of generosity but also because they relate to earned income in different ways. As suggested in Section 3, a revalued lifetime earnings defined benefit plan and a notional account-type defined contribution scheme have similar accrual structures, although individuals may perceive the incentives quite differently. Therefore, we can ask, would notional accounts defer retirement relative to other types of plans: say, a 'backloaded' defined benefit plan, in which pension benefits are related in a non-linear fashion to lifetime earnings (linked, perhaps, only to final earnings), or relative to a funded defined contribution plan? And would a notional accounts framework represent any additional improvement on a defined benefit plan which contained the appropriate actuarial adjustments and a revalued lifetime earnings measure in determining pension benefits?

The standard argument concerning a 'backloaded' defined benefit plan is that mandatory retirement is required because the marginal pension accrual from remaining in the labour force is increasing with scheme duration.³⁵ Thus there is no *a priori* reason why the incentive structure implicit in notional accounts would lead to later retirement than a non-linear defined benefit plan — indeed, quite the reverse. We observe early retirement ages in the latter kind of plan because many defined benefit schemes contain early retirement options without adequate actuarial penalties. In addition, members of private, funded, defined benefit plans generally have other savings. So there is a pure income effect that

³⁴ The implicit model becomes very much more complicated if individuals may subsequently regret retiring, since it is unlikely that the individual can simply reverse the decision costlessly.

³⁵ The seminal reference is Lazear (1979). For further discussion, see Disney (1996) Chapters 5 and 7, and Disney and Whitehouse (1996, 1999).

induces earlier retirement.³⁶ It is almost universally accepted by pension commentators (although not, unfortunately by all governments) that elimination of actuarially overgenerous early retirement incentives are an essential component of pension reform, *whatever the ultimate choice of pension scheme*.

In the case of a *funded* defined contribution plan, we reach a similar conclusion, but by a different route. Consider the accrual structure of a notional account, repeating equation (1), and compare this with the accrual structure of a funded defined contribution plan (equation 3):

$$p = g \sum_{t=0}^R w_t (I_R / I_t) c \quad (1')$$

$$p = \alpha_R \sum_{t=0}^R w_t (1+r)^{R-t} c \quad (3)$$

In equation (3), α_R is the annuity factor that the insurer would apply to a person retiring at time R . The contributions, as a fraction of wages, compound at the market rate of return r , less any administrative charges. In fact, r operates in the same way as the revaluation factor I in equation (1). Since dynamic efficiency normally holds, r almost certainly exceeds I . Likewise, unless there are substantial transaction costs or market failures the annuity rate, α_R should at least be equal to g so long as the annuity can earn the riskless rate of interest and the riskless rate of interest is not less than the growth of the real wage bill. Therefore a funded defined contribution scheme should always generate a higher fund 'return' from one extra year's postponement of annuitisation than an unfunded notional accounts programme.

Neither is there any particular reason why notional accounts should extend the working life any more than a defined benefit scheme in which generous early retirement options have been phased out and the appropriate actuarial adjustments are made. Nearly half of OECD countries either award pension increments for deferring retirement past the normal age or reduce pensions for early retirement (and many do both). These adjustments on average add 6½ per cent to the pension for each year's delay in claiming the pension.

³⁶ For illustrations, see Disney, Meghir and Whitehouse (1994).

This is similar to the change in pension for an extra year's work in notional accounts programmes. So retirement incentives are the same.³⁷

Overall, therefore, we conclude that the incentives to defer retirement in a notional accounts scheme are little different from those of a defined benefit scheme with the appropriate actuarial adjustments. If the idea of 'individual accounts' is seen as central to a strategy to defer retirement decisions, then the argument for a shift to *funded* individual accounts becomes more dominant.

6. Conclusion

This paper has considered the implementation of, and rationale for, pension reforms based on notional accounts. (These are sometimes known as notional defined contribution plans or NDCs). The distinguishing feature of such reforms is that a structure of individual accounts is established, in which contributions notionally accrue. No fund as such is established and the implicit 'return' on such accounts is determined by a formula linked to some underlying index of long run fiscal sustainability. I contrasted this 'third way' with two other reform strategies: a 'parametric' reform strategy (as favoured by the IMF) in which the existing defined benefit plan was fixed up, and a transition strategy by which the pension scheme was largely converted to a set of individual *funded* accounts.

After examining some early precedents for such schemes, and describing actual reform processes in a number of countries along notional accounts lines, a generic notional accounts reform was evaluated using three broad criteria. First, a welfare criterion: is such a scheme 'fairer' and does it provide greater opportunities for insurance? Secondly, a macroeconomic criterion: is such a scheme more likely to generate fiscal sustainability and be more credible than alternative reform packages? Thirdly, a microeconomic criterion: is the scheme likely to reduce incentives to retire early more than alternative pension plans?

From our literature survey and arguments presented here we can conclude that whatever the advantages of the notional account reforms, they do not dominate other

³⁷ Outside the OECD, however, rather fewer systems have these adjustments (18 countries) and the adjustment rate is much lower (3½ per cent on average). Disney and Whitehouse (1999).

strategies, especially those that introduce true diversification between unfunded and funded components. Furthermore,

- Notional accounts may have some attractive *political* features in specific circumstances, where there are limits on the feasibility of other reform packages.
- By automatically adjusting (albeit partially) the retirement age to changes in life expectancy, notional accounts may help avoid contentious political debate about the explicit normal retirement age.
- Nevertheless, there is no economic reason why notional accounts should induce people to retire later than reforms that eliminate actuarially over-favourable early retirement in public defined benefit plans and/or that introduce a funded component to the pension system.
- They may not be as transparent as sometimes argued, for example with respect to the complexities of the indexation and annuity calculations.
- Notional accounts cannot be 'actuarially fair' so long as dynamic efficiency holds, and while *marginal* 'fairness' can be improved, this process is intrinsically similar to a 'parametric' reform of a defined benefit plan.
- Macroeconomic risks affect notional accounts in the same way as any other pay-as-you-go scheme.
- Overall, notional accounts are, in effect, identical to a well designed defined benefit pay-as-you-go scheme with reasonable actuarial adjustments and benefits based on revalued average lifetime earnings.³⁸

A strategy which combines 'parametric' features designed to eliminate the more unsustainable features of the existing unfunded programme coupled with greater emphasis on funding the 'insurance' element of the pension plan is either as good as or superior in almost every dimension. The key point to bear in mind is that any reform to enhance the sustainability of a pension system requires that some members of some generations lose out. In a 'parametric' reform, these costs are explicit. Even in a move to partial or complete

³⁸ Again quoting Scherman (1999), "It seems as if a Notional Defined Contribution (NDC) scheme could be very accurately characterized as 'a thoroughly reformed pay-as-you-go defined benefit scheme.'"

funding of the pension system, it is, or should be, well understood that even if the new long run equilibrium increases welfare, the transition will involve some cost to some generations.

If the object of reforms that shift traditional, defined benefit schemes to notional accounts is to make it transparent that pension claims must be sustainable, then it is unclear why such a reform should be politically superior. Some people must inevitably find that their pensions are lower in the new system and it is not apparent why they would feel better about it because of the reform. On the other hand, if it is the complexities of procedures in notional accounts that facilitate such a reform, then the claim to greater transparency is shallow. Moreover, there is a real risk of costly loss of credibility when the realities of the system are revealed. In the end, there is no getting around the fact that educating the voting population on the hard choices associated with the sustainability of pension finances is a key challenge for reformers everywhere.

References

- Aaron, H.J. (1966), 'The social insurance paradox', *Canadian Journal of Economics*, 32, August, 371-374.
- Abel, A., Mankiw, N.G., Summers, L.H. and Zeckhauser, R.J. (1989), 'Assessing dynamic efficiency: theory and evidence', *Review of Economic Studies*, 56, 1-20.
- Boskin, M., Kotlikoff, L. and Shoven, J. (1988), 'Personal security accounts: a proposal for fundamental social security reform', 179-206 in S. Wachter (ed.) *Social Security and Private Pensions*, Lexington Books.
- Buchanan, J. (1968), 'Social insurance in a growing economy: a proposal for radical reform', *National Tax Journal*, 21, December, 386-39.
- Chand, S.K. and Jaeger, A. (1996), 'Aging populations and public pension schemes', Occasional paper no. 147, International Monetary Fund, Washington, D.C.
- Chlon, A., Góra, M. and Rutkowski, M. (1999), 'Shaping pension reform in Poland: Security through Diversity', Pension Reform Primer series, Social Protection Discussion Paper no. 9923, World Bank, Washington, D.C.
- Cozzolino, M. and Padoa Schioppa Cordero, F. (1995), 'Contribution-based v. earnings-related retirement pension systems: some policy proposals for Italy', *Ricerche Economiche*, 49, December, 375-404.
- Diamond, P. (1997), 'Insulation of pensions from political risk', 33-58 in S. Valdés-Prieto (ed.) *The Economics of Pensions*, Cambridge: Cambridge University Press.
- Disney, R. (1996), *Can We Afford to Grow Older?* MIT Press, Cambridge, Mass.
- (1999), 'OECD pension systems in crisis: an evaluation of the reform options', Pension Reform Primer series, Social Protection Discussion Paper no. 9921, World Bank, Washington, D.C.
- , Meghir, C. and Whitehouse, E. (1994), 'Retirement behaviour in Britain', *Fiscal Studies*, 15, February, 24-43.
- , Palacios, R. and Whitehouse, E. (1999), 'Individual choice of pension arrangement as a pension reform strategy', Institute for Fiscal Studies Working Paper no. 99/18, London.
- and Whitehouse, E. (1992), *The Personal Pensions Stampede*, Institute for Fiscal Studies, London.
- and — (1996), 'How much are occupational pension entitlements worth in Britain?' *Economica*, 63, 213-238.
- and — (1999), 'Pension plans and retirement incentives', Pension Reform Primer series, Social Protection Discussion Paper no. 9924, World Bank, Washington, D.C.
- Estaban, J.M. and Sákovic, J. (1993), 'Intertemporal transfer institutions', *Journal of Economic Theory*, 61, 189-205.
- Feldstein, M. (1996), 'The missing piece in policy analysis: social security reform', *American Economic Review*, 86, May, 1-14.
- and Samwick, A.A. (1998), 'The transition path in privatizing social security', 215-260 in Feldstein, M. (ed.) *Privatizing Social Security*, University of Chicago Press for National Bureau of Economic Research.
- Flanagan, K. (1999), 'Australia's changing retirement income system', Pension Reform Primer series, Social Protection Discussion Paper, World Bank, Washington, D.C., forthcoming.
- Fox, L., and Palmer, E. (1999), 'Latvian pension reform', Social Protection Discussion Paper no. 9922, World Bank, Washington, D.C.

- Góra, M. and Rutkowski, M. (1998), 'The quest for pension reform: Poland's *Security through Diversity*', Pension Reform Primer series, Social Protection Discussion Paper no. 9815, World Bank, Washington, D.C.
- Hamann, A. Javier (1997), 'The reform of the pension system in Italy', *mimeo.*, European I Department, International Monetary Fund, Washington, D.C.
- Hassler, J. and Lindbeck, A. (1996), 'Optimal actuarial fairness in pensions systems: a note', Institute for International Economic Studies, Stockholm, April.
- and — (1997), 'Intergenerational risk-sharing, stability and optimality of alternative pension systems', Institute for International Economic Studies, Stockholm, December.
- Hausner, J. (1998), 'Security through diversity: conditions for successful pension reform in Poland', Collegium Budapest Working Paper, March.
- Holzmann, R. (1998), 'Financing the transition to multipillar', Pension Reform Primer series, Social Protection Discussion Paper no. 9809, World Bank, Washington, D.C.
- (2000), 'The World Bank approach to pension reform', *International Social Security Review*, 53, No. 1, 11-34.
- International Monetary Fund, *International Financial Statistics*, various issues.
- Kotlikoff, L.J. (1998), 'Simulating the privatization of social security in general equilibrium', 265-306 in M. Feldstein (ed.) (1998), *Privatizing Social Security*, University of Chicago Press for National Bureau of Economic Research.
- , Smetters, K.A. and Walliser, J. (1998), 'Opting out of social security and adverse selection', National Bureau of Economic Research Working Paper no. 6430, Cambridge, Mass.
- Lazear, E. (1979), 'Why is there mandatory retirement?' *Journal of Political Economy*, 87, 6, 1261-1284.
- Lee, R. and Skinner, J. (1999), 'Will aging baby boomers bust the Federal budget?' *Journal of Economic Perspectives*, 13, Winter, 117-140.
- Lerner, A.P. (1959), 'Consumption-loan interest and money', *Journal of Political Economy*, 67, 512-518.
- McHale, J. (1999), 'The risk of social security benefit changes: some international evidence', National Bureau of Economic Research Working Paper no. 7031, Cambridge, Mass.
- Miles, D. and Iben, A. (1998), 'The reform of pension systems: winners and losers across generations in the UK and Germany', *mimeo.*, Imperial College, London, July.
- OECD *Economic Surveys: Sweden*, various issues.
- Office of the Government Plenipotentiary for Social Security Reform (1997), *Security through Diversity: Reform of the Pension System in Poland*, Warsaw.
- Palacios, R. (1998), 'A note on diversification between funded and PAYG schemes', *mimeo.*, World Bank, Washington, D.C.
- and Whitehouse, E. (1998), 'The role of choice in the transition to a funded pension system', Pension Reform Primer series, Social Protection Discussion Paper no. 9812, World Bank, Washington, D.C.
- Palme, M. and Svensson, I. (1997), 'Social security, occupational pensions and retirement in Sweden', National Bureau of Economic Research Working Paper no. 6134, Cambridge, Mass.
- Palmer, E. (1999), 'The Swedish pension reform — framework and issues', *mimeo.*, National Social Insurance Board, Stockholm.
- Samuelson, P.A. (1958), 'An exact consumption-loan model of interest with or without the social contrivance of money', *Journal of Political Economy*, 66, December, 467-482.

- (1969), 'Reply to Lerner', *Journal of Political Economy*, 67, 518-522.
- Scherman, K.G. (1999), 'The Swedish pension reform', Issues in Social Protection Discussion Paper no. 7, International Labour Office, Geneva.
- Schieber, S.J., Dunn, R. and Wray, D.L. (1998), 'The future of the defined contribution revolution', in Mitchell, O.S. and Schieber, S.J. (eds), *Living with Defined Contribution Pensions: Remaking Responsibility for Retirement*, University of Pennsylvania Press, Philadelphia, Penn.
- Schwarz, A. and Demirguç-Kunt, A. (1999), 'Taking stock of pension reforms around the world', Pension Reform Primer series, Social Protection Discussion Paper no. 9917, World Bank, Washington, D.C.
- and Valdés-Prieto, S. (1999), 'Fiscal sustainability of notional account pension systems: a policy brief', *mimeo*, World Bank, Washington, D.C.
- Ståhlberg, A.-C. (1995), 'Pension reform in Sweden', *Scandinavian Journal of Social Welfare*, 4, 267-273.
- Stock, J.H. and Wise, D.A. (1990), 'Pensions, the option value of work and retirement', *Econometrica*, 58, September, 1151-1180.
- Sundén, A. (1998), 'The Swedish pension reform', *mimeo*, Federal Reserve Board, April.
- Valdés-Prieto, S. (1999), 'The financial stability of notional account pensions', *mimeo*, Catholic University of Chile.
- Whitehouse, E. (1997), 'Individual pension choice and the transition to a funded pension system in Poland', *mimeo*, Office of the Government Plenipotentiary for Social Security Reform, Warsaw.
- (1998), 'Pension reform in Britain', Pension Reform Primer series, Social Protection Discussion Paper no. 9810, World Bank, Washington, D.C.
- (1999a), 'The tax treatment of funded pensions', Pension Reform Primer series, Social Protection Discussion Paper no. 9910, World Bank, Washington, D.C.
- (1999b), 'Consumer financial literacy, public information and pension reform: a case study of the United Kingdom', Pension Reform Primer series, Social Protection Discussion Paper, World Bank, Washington, D.C., forthcoming.
- World Bank (1994), *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth*, New York: Oxford University Press.
- (1999), 'Switching: the role of choice in the transition to a funded pension system', Pension Reform Primer briefing, Washington, D.C.

Social Protection Discussion Paper Series

<u>No.</u>	<u>Title</u>
0006	Social Risk Management: A New Conceptual Framework for Social Protection and Beyond
0005	Active Labor Market Programs: Policy Issues for East Asia
0004	Pension Reform, Financial Literacy and Public Information: A Case Study of the United Kingdom
0003	Managing Public Pension Reserves Part I: Evidence from the International Experience
0002	Extending Coverage in Multi-Pillar Pension Systems: Constraints and Hypotheses, Preliminary Evidence and Future Research Agenda
9934	Helping the Poor Manage Risk Better: The Role of Social Funds
9933	Coordinating Poverty Alleviation Programs with Regional and Local Governments: The Experience of the Chilean Social Fund - FOSIS
9932	Poverty and Disability: A Survey of the Literature
9931	Uncertainty About Children's Survival and Fertility: A Test Using Indian Microdata
9930	Beneficiary Assessment of Social Funds
9929	Improving the Regulation and Supervision of Pension Funds: Are there Lessons from the Banking Sector?
9928	Notional Accounts as a Pension Reform Strategy: An Evaluation
9927	Parametric Reforms to Pay-As-You-Go Pension Systems
9926	An Asset-Based Approach to Social Risk Management: A Conceptual Framework
9925	Migration from the Russian North During the Transition Period
9924	Pension Plans and Retirement Incentives
9923	Shaping Pension Reform in Poland: Security Through Diversity
9922	Latvian Pension Reform

Social Protection Discussion Paper Series continued

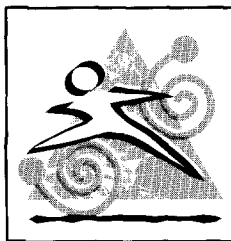
<u>No.</u>	<u>Title</u>
9921	OECD Public Pension Programmes in Crisis: An Evaluation of the Reform Options
9920	A Social Protection Strategy for Togo
9919	The Pension System in Singapore
9918	Labor Markets and Poverty in Bulgaria
9917	Taking Stock of Pension Reforms Around the World
9916	Child Labor and Schooling in Africa: A Comparative Study
9915	Evaluating the Impact of Active Labor Programs: Results of Cross Country Studies in Europe and Central Asia
9914	Safety Nets in Transition Economies: Toward a Reform Strategy
9913	Public Service Employment: A Review of Programs in Selected OECD Countries and Transition Economies
9912	The Role of NPOs in Policies to Combat Social Exclusion
9911	Unemployment and Unemployment Protection in Three Groups of Countries
9910	The Tax Treatment of Funded Pensions
9909	Russia's Social Protection Malaise: Key Reform Priorities as a Response to the Present Crisis
9908	Causalities Between Social Capital and Social Funds
9907	Collecting and Transferring Pension Contributions
9906	Optimal Unemployment Insurance: A Guide to the Literature
9905	The Effects of Legislative Change on Female Labour Supply: Marriage and Divorce, Child and Spousal Support, Property Division and Pension Splitting
9904	Social Protection as Social Risk Management: Conceptual Underpinnings for the Social Protection Sector Strategy Paper

Social Protection Discussion Paper Series continued

<u>No.</u>	<u>Title</u>
9903	A Bundle of Joy or an Expensive Luxury: A Comparative Analysis of the Economic Environment for Family Formation in Western Europe
9902	World Bank Lending for Labor Markets: 1991 to 1998
9901	Active Labor Market Programs: A Review of the Evidence from Evaluations
* The papers below (No. 9801-9818) are no longer being printed, but are available for download from our website at www.worldbank.org/sp	
9818	Child Labor and School Enrollment in Thailand in the 1990s
9817	Supervising Mandatory Funded Pension Systems: Issues and Challenges
9816	Getting an Earful: A Review of Beneficiary Assessments of Social Funds
9815	This paper has been revised, see Discussion Paper No. 9923
9814	Family Allowances
9813	Unemployment Benefits
9812	The Role of Choice in the Transition to a Funded Pension System
9811	An Alternative Technical Education System: A Case Study of Mexico
9810	Pension Reform in Britain
9809	Financing the Transition to Multipillar
9808	Women and Labor Market Changes in the Global Economy: Growth Helps, Inequalities Hurt and Public Policy Matters
9807	The World Bank Approach to Pension Reform
9806	Government Guarantees on Pension Fund Returns
9805	The Hungarian Pension System in Transition
9804	Risks in Pensions and Annuities: Efficient Designs
9803	Building an Environment for Pension Reform in Developing Countries

Social Protection Discussion Paper Series continued

<u>No.</u>	<u>Title</u>
9802	Export Processing Zones: A Review in Need of Update
9801	World Bank Lending for Labor Markets: 1991 to 1996



Summary Findings

The paper surveys and evaluates Notional Account-type pension reforms (sometimes known as Notional Defined Contribution plans, or NDCs). The distinguishing feature of such reforms is that a structure of individual accounts is established, to which contributions notionally accrue. No fund as such is established and the implicit 'return' on such accounts is determined by a formula linked to some underlying index of real wage bill growth. Notional Account (NA)-type reforms are described in a number of countries: in Italy, Latvia, Sweden and Poland.

Notional Accounts are, in effect, identical to a well-designed defined benefit PAYG scheme with reasonable actuarial adjustments and a revalued lifetime earnings basis to pension benefits. The paper argues that, when examined on grounds of 'actuarial fairness', macroeconomic sustainability and microeconomic incentives, a reform strategy that introduces Notional Accounts as the centrepiece of the package is inferior to a strategy that combines 'parametric' reforms of the existing unfunded programme with greater emphasis on funding the 'insurance' element of the pension plan.

HUMAN DEVELOPMENT NETWORK

About this series...

The World Bank Pension Reform Primer aims to provide a timely and comprehensive resource for those engaged in the design and implementation of pension reforms around the world. Policymakers and those who advise them will find useful information on other reform experiences, the current thinking of pension specialists and a vast array of cross-country evidence. A flexible and dynamic format ensure that key developments are updated as they occur.

The World Bank set out a conceptual framework for fundamental pension reform in *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth*. This study, published in 1994, helped shape the global debate about the impact of population ageing on pension systems. The Pension Reform Primer builds on this pioneering work and on the experience of the World Bank and other international institutions in the last five years. It focuses on practical questions.

For more information, please contact Social Protection, Human Development Network, World Bank, 1818 H Street NW, Washington, D.C. 20433; telephone +1 202 458 5267; fax +1 202 614 0471; e-mail socialprotection@worldbank.org. All Pension Reform Primer material is available on the internet at www.worldbank.org/pensions